

AD-A262 215



**1992
Executive Research Project
SP4**

Policy Recommendations to Improve Selected American Industrial Base Capabilities

**Lieutenant Colonel
Robert H. Bishop
U.S. Army**

Faculty Research Advisor
CDR Annette M. Wiechert, USN



**The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-6000**

98 3 29 022

93-06355
 5090

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

(2)

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY N/A			3. DISTRIBUTION/AVAILABILITY OF REPORT Distribution Statement A: Approved for public release; distribution is unlimited.	
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A			5. MONITORING ORGANIZATION REPORT NUMBER(S) Same	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NDU-ICAF-92-SP4			7a. NAME OF MONITORING ORGANIZATION National Defense University	
6a. NAME OF PERFORMING ORGANIZATION Industrial College of the Armed Forces		6b. OFFICE SYMBOL (If applicable) ICAF-FAP	7b. ADDRESS (City, State, and ZIP Code) Fort Lesley J. McNair Washington, D.C. 20319-6000	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. PROJECT NO. TASK NO. WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) <i>Policy Recommendations to Improve Selected American Industrial Base Capabilities</i>				
12. PERSONAL AUTHOR(S) <i>Robert H. Bishop</i>				
13a. TYPE OF REPORT Research		13b. TIME COVERED FROM <u>Aug 91</u> TO <u>Apr 92</u>		14. DATE OF REPORT (Year, Month, Day) April 92
15. PAGE COUNT				
16. SUPPLEMENTARY NOTATION				
17. COSATI CODES FIELD GROUP SUB-GROUP			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) SEE ATTACHED				
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Judy Clark			22b. TELEPHONE (Include Area Code) (202) 475-1889	22c. OFFICE SYMBOL ICAF-FAP

DTIC
SELECTE
MAR 30 1993
S B D

ABSTRACT

This study was accomplished at the request of the Joint Chiefs of Staff, Director of Logistics (J-4). The study is a part of two other studies to review the Industrial College of the Armed Forces (ICAF) Defense Industry Studies (DIS) for the J-4. Five of the fifteen Defense Industry Studies --Railroads and Trucking, Medical, Fossil Fuels and Petrochemicals, Critical Materials, and Food and Textiles are addressed in this paper. Five years of ICAF Defense Industry Studies from 1987 through 1991 form the basis of the analysis. The study includes the thrust of the DIS studies, observations on each of the five industries, recurring recommendations made in the ICAF studies, and recommended actions required to solve identified deficiencies and problem areas to ensure these industries maintain the capability to support the mission and needs of DoD.

1992
Executive Research Project
SP4

Policy Recommendations to Improve Selected American Industrial Base Capabilities

Lieutenant Colonel
Robert H. Bishop
U.S. Army

Faculty Research Advisor
CDR Annette M. Wiechert, USN



The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-6000

DISCLAIMER

This research report represents the views of the author and does not necessarily reflect the official opinion of the Industrial College of the Armed Forces, the National Defense University, or the Department of Defense.

This document is the property of the United States Government and is not to be reproduced in whole or in part for distribution outside the federal executive branch without permission of the Director of Research and Publications, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C. 20319-6000.

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
R-1	

DTIC QUALITY INSPECTED 1

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
I	INTRODUCTION.....	1
II	BACKGROUND.....	2
III	ICAF DIS PERSPECTIVE AND RECURRING RECOMMENDATIONS...	4
IV	OBSERVATIONS.....	12
V	CONCLUSIONS.....	23
 <u>APPENDIX</u>		
A	RAILROADS AND TRUCKING.....	27
B	MEDICAL.....	29
C	FOSSIL FUELS AND PETROCHEMICALS.....	33
D	CRITICAL MATERIALS.....	36
E	FOOD AND TEXTILES.....	38

SECTION I

INTRODUCTION

"When your weapons are dulled and ardor damped, your strength exhausted and treasure spent, neighboring rulers will take advantage of your distress to act. And even though you have wise counsellors, none will be able to lay good plans for the future." Sun Tzu¹

In September 1991, the Joint Chiefs of Staff, Director for Logistics (J-4) proposed a research project to review previous Industrial College of the Armed Forces (ICAF) Defense Industry Studies assessments and to review and develop potential policy options to address recommendations noted by the studies. Three ICAF students volunteered to perform the study and analysis of previous ICAF Defense Industry Studies (DIS).

This paper addresses five of the fifteen ICAF Defense Industry Studies --railroads and trucking, medical, fossil fuels and petrochemicals, critical materials, and food and textiles. Of significance is that these five are not pure defense industries; in fact, they could be considered national infrastructure industries which happen to provide the Department of Defense the means to accomplish its mission. These industries will survive with or without large defense expenditures, unlike other industries addressed in the ICAF DIS(s). The question then

becomes the health of these five industries and "how can" or "is it possible" to keep a segment of the industry focused on the desires and needs of the Department of Defense?

As requested by the J-4, JCS, an examination of previous ICAF DIS was accomplished first. Recommendations from the last five years were extracted and compared for recurring recommendations. Section III outlines the focus and the recurring recommendations for each of the DIS(s). A complete listing of recommendations from the previous five years are displayed in appendices A through E. Observations from the studies, other studies and research, and personal observations are amplified in Section IV. In the last section my overall conclusion and recommendations derived from analysis which are common to more than one industry are listed for JCS consideration.

SECTION II

BACKGROUND

The decade of the nineties has been labeled "the decade of challenge for the defense industry"². Cuts in the defense budget are clearly mandated by a changing political landscape but they must be gradual, taking into consideration mature threat scenarios and the health of the defense industrial base.³ If DoD's plan is implemented, by the end of 1997, the U.S. will be

out of business in several defense industries and ready to exit business in several others.⁴ Comments such as these are common as our government grapples with the needs of the nation.

The eighties marked the final offensive in the Cold War. Our record peace time spending and perceived technological superiority created a condition in which the poorly managed Soviet economy could not compete. As the Berlin Wall fell and the Soviet Block crumbled, Desert Storm unfolded in Southwest Asia. The performance of the U.S., to include our combat and support systems, demonstrated to many, a level of superiority and a sense of invincibility never before experienced which reinforces the success of the final U.S. Cold War strategy.

The ramifications of the eighties and winning the cold war, coupled with the U.S. Gulf War performance have created the current situation of strong calls for redirection of government spending. With no global threat to world security, defense spending and forces are decreasing rapidly. The U.S. Armed Forces' performance in the desert further reinforces the claims for reduced expenditures, and the redirection of the economy. The U.S. defense industries built to combat a global threat are now seen as too big and post cold war spending will not support them. Many of these industries may not be able to adjust to the post cold war era. The impact of this potential loss must be assessed against our future national security needs.

The question for the leadership of the country is now "how do we retain the technological and industrial base essential for the future security of the Nation?" The downsizing and restructuring of the industrial base is inevitable given the lack of a perceived threat, the current state of the US economy, and the requirement to compete in a highly competitive global market. This combination of events makes it more essential, now than ever before, that the industrial base produce a quality and cost effective product. Simultaneously, the government must be both efficient and effective in management and leadership practices to reduce the expenditure of public funds. This all must be accomplished while ensuring both our armed forces remain capable of defending the security of the Nation and the industrial base remains viable.

SECTION III

ICAF DIS PERSPECTIVE AND RECURRING RECOMMENDATIONS

Before examining the observations and recommendations made by the ICAF DIS committees over the previous five year, it is critical to understand the context of the study effort. A review of the purpose of the ICAF Defense Industry Studies finds three long term objectives: (1) developing an executive and a strategic perspective of the industry and their role in producing the Nation's requirements in peace and emergency conditions, (2) to

permit a comparative analysis of similar US and international defense industries, (3) to develop policy options to enhance industrial preparedness.⁵ As noted by these objectives, the primary purpose of the defense industry studies is academic understanding --i.e. how to analyze and evaluate industry. Policy options and/or recommendations are by-products and not the primary thrust of the studies.

Other aspects of the studies became apparent during my review which are important to consider in understanding the differences in depth or breadth of a particular study. In some cases, a study was focused over the entire industry which led to very generalized comments due to allotted time. In others, a very narrow scope was taken in a given year on a particular industry and very detailed comments were generated over a segment of the industry. Finally, many of the concerns and observations generated in studies prior to the 1991, were negated or validated in the 1991 studies, as the DIS committees focused on their industries performance during and after Desert Shield and Storm.

A complete list of recommendations made by the DIS committees over the last five years for the industries addressed in this paper are contained in appendices A through E. The following are summaries and the recurring recommendations of the five industry studies:

Railroads and Trucking

The major emphasis of this study has involved the examination of the US railroad and trucking industries to meet defense requirements and the ability of the government to orchestrate its use during emergency situations. The thrust of recommendations over the previous five years are-two fold: (1) the ability of FEMA and U.S. TRANSCOM to plan and execute the various transportation aspects of mobilization, and (2) the administrative and bureaucratic hurdles to ease procedures in obtaining services. The Gulf war virtually eliminated these concerns in the 1991 report.

The railroad and trucking industry has been seen as generally healthy and improving. Sufficient dollars are being invested research and development by the industries. Deregulation has made carriers more efficient, competitive and responsive. Key to the continued growth is adherence to the National Transportation Policy and emphasis on the Nation's highway infrastructure.

The one recurring observation throughout the five years applies to the railroad industry:

-Railroads need significant reorganization and updated collective bargaining procedures to remain competitive.

MEDICAL

The medical defense industry studies have matured tremendously over the last five years. The thrust of the DIS has been to examine the requirements of DOD from peace through mobilization and to determine its ability to meet these needs. It is to also examine the capacity and the "health" of the industry and how DOD obtains the services required.

The studies have consistently found an industry with cost growing at a clip above inflation and making more and more decisions based on financial implications. The industry is robust and competition is driving more and more decisions. Many of the concerns during mobilization were tested in 1990-91 as DOD prepared for the worst. Though, Desert Storm was more of an exercise than a test, many of the 1991 DIS recommendations provided direction for future studies and emphasis for planners. Also, brought to light were a several pharmaceutical problems which were exposed during operations in the gulf. These problems along with recommendations will be seen in the recurring recommendations and policy recommendations.

The recurring recommendations from the Medical DIS were as follows:

- Assure incentives are evident to attract, train, and retain qualified health care providers, insuring "proper" geographic and

specialty distribution.

- Regularly assess the ability of the changing U.S. based pharmaceutical industry to produce critical drug items.
- Consider contracting out part of DPSC operations (medical supplies) to save money and improve support to the field.

FOSSIL FUELS AND PETROCHEMICALS

The fossil fuel and petrochemical defense industry studies have concentrated on the production of fossil fuels to satisfy the nation's defense needs. It also has addressed trade-offs between energy and environmental issues and the ability of the petrochemical and allied industries to support us and allied energy requirements.

Of the five defense industry studies examined, the one whose DIS recommendations has changed the least over the period to include the gulf war, is the fossil fuels and petrochemical industry. It is an industry which is truly global and sensitive to world events due to our and our allies dependence on it for economic security.

The recurring defense industry recommendations were as follows:

- Increase the Strategic Petroleum Reserve (SPR) to 1 billion barrels using leased oil.

- Subsidize, through appropriate economic incentives, R&D and test plant construction of the most promising renewable energy technologies (windpower, solar, biomass, nuclear).
- Aggressively conduct R&D into developing a safe and efficient nuclear fusion technology and implement it as soon as it is feasible.
- Incentivize energy related industries and markets.
- Promote renewable energy sources.
- Rethink and work to resolve nuclear energy issues.

CRITICAL MATERIALS

The "Critical Materials" Defense Industry Studies are unique compared to the other studies. This set of studies is not tied to any industry. Primarily it has attempted to assess the current state of the policy arena for essential materials in general and the condition of selected material industries in particular. In only four of the last five years has there been a Critical Materials DIS. In fact, there is not one this year. The 1989 and 1990 studies explored the dimensions of a national materials policy required for the 21st century. They identified many of the facets and areas which should be addressed in a national policy.

The selected materials while not an industry per se, can be looked at as the basic infrastructure for many of our defense

industries. Our defense industries' ability to produce the materials required may be questionable based on the producers of the raw materials or finished product. This coupled with policies directed toward the material and/or the country which has the desired assets may have significant ramifications.

The recurring recommendation over the course of the studies:

- The U.S. needs to develop a national mineral policy.

FOOD AND TEXTILES

Food and Textiles is the most recent addition to the Defense Industry Studies program. This program of study began in 1989, hence only two years of recommendations are in the appendix. The DIS participants have focused their studies on agriculture production, processing and consumption with a mobilization focus. Also, as a new DIS the breadth and depth of study is still being defined as students examine issues and their effect and/or use in our national defense.

Food and textiles is an area which is often taken for granted, not only by the American public but also by our senior leaders. Desert Storm brought the importance of it back into center light, as a nation without a build up period attempted to meet the demands of over 500,000 service men and women 7000 miles away.

The recurring recommendations from the last two years:

- Continue to study the feasibility of using shorter shelf life commercial food products for combat rations and more easily assembled chemical suits from available materials to meet military requirements.
- Drop surge capacity requirements for unique item vendors where the lack of any commercial application causes severe inefficiency, high cost, or low profit.
- Coordinate competitive and industrial base expansion efforts such that small qualified vendors are not reduced to producing inefficient lot sizes.
- Freeze lot sizes in contracts to prevent decreases which may cause current producers of marginally productive unique items to go bankrupt.
- Use shelf life of apparel items to advantage by producing larger lot sizes and storing for mobilization preparedness or increase automated apparel manufacturing contracts and store textile bolts rather than higher value-added finished garments.
- Incentivize flexible manufacturing techniques to allow for easy conversion from military to commercial items in both food and textiles.

SECTION IV

OBSERVATIONS

The previous section addressed the overall thrust of each DIS study, the general status of the industries, and the recurring recommendations from the studies. This section provides observations and insights into the five industries addressed in this paper, which supports the foundation for many of the DIS recommendations. These observations are drawn from the DIS studies, other studies and research, and personal study. The following are the observations made on each of the selected industry:

Railroads and Trucking

The 1980's have seen the wholesale deregulation of both industries -- a mixed blessing to the trucking industry and the salvation of the American railroad industry.⁶ Though arguable, deregulation has put both industries in tune with the market place and especially the customer. The deregulation movement in the early eighties particularly with respect to the railroads was the beginning and not the end as many had feared.

As these industries react to the pressures of the market, much work still needs to be accomplished to end the remaining

trappings of a previously regulated industry. Labor practices in the rail industry still reflect the regulated era of decades long passed. Though industry and labor are working to end some archaic practices comments like -- "a days work for a days pay" and labor unions must make concessions in order for the railroads to remain competitive are not uncommon.⁷ Other observations include:

- DoD is the single largest user of transportation services in the U.S.
- Intransit technologies (i.e. location, routing, inventory) and their application is leading to greater efficiencies.
- Military Traffic Management Command (MTMC) is attempting to ensure DoD pays lowest possible rates.
- Rail labor conditions continue to reduce productivity and efficiencies.
- DoD support for continued deregulation and infrastructure rebuilding is key.

Industry recognition of what needs to be accomplished and the direction in which they are moving is highlighted by a statement from John Snow, Chief Executive Officer of CSX Corporation -- "Customers are saying, don't just make sure it gets there; make sure it gets there on time; make sure we can trace it; and make it easy for us to do business with you."⁸ This is the thrust of both industries. With this attitude and with the forces of the market both industries will continue to meet the needs of DoD.

Medical

As noted in the preceding section, the medical industry is robust and reacting to the market. Many concerns remain, some of which can and will impact not only on the nation as a whole but also on the military health care system. Major concerns include:⁹

- The government pays for over 40% of the nations health care.
- Cost containment must be continued to be stressed and worked.
- Distribution of physicians and manning levels of specialties are not balanced to the need.
- The nursing shortage is real.
- Foreign sourcing of medical equipment is increasing.
- There is no formal mobilization planning process which includes all major facets of the medical industry.
- DoD health care system is almost totally dependent on the civilian health care system.
- Pharmaceutical and surgical instrument manufacturers continue to move off shore.
- DoD requires some unique drugs, vaccines, and equipment not used or needed in the amounts required by the civil sector.
- Biological and Chemical warfare mass casualty planning does not get the attention it deserves.

While the U.S. still maintains one of the best health care systems in the world and is in the forefront in research and

development, the market drives the system. While we believe that competition improves the services provided, it taxes the DoD health care system. The rising cost of equipment, which changes as fast as new technology can be introduced, also creates new standards of health care. Unlike other areas in DoD, it is unacceptable not to be able to provide state of the art technology to the military health care providers. This is even complicated more by having to "ruggedize" some of the new equipment to make it survivable in less than ideal conditions.

Every conflict creates new standards for health care. Desert Storm was no exception. The challenge for DoD is to preserve a viable health care system in a time of reduction which is capable of meeting the standards expected by the nation. Americans expect their sons and daughters to receive the same high quality care wherever they are stationed or deployed.

Fossil Fuels and Petrochemicals

The fossil fuel and petrochemical industry is a transnational phenomena, heavily influenced by political and economic factors. It can be easily argued that it is the nucleus of our economy and any reduction in the supply which impacts adversely on the health of the economy can be quickly translated into a vital interest. Probably one of the most difficult aspects of any analysis of the

industry is distinguishing between fact and fiction. Which and whose figures to base rationale decisions on is the second most difficult task.

A few of the pertinent facts include:¹⁰

- The U.S. has not built a new refinery in over 10 years.
- The U.S. consumes over 27% of the worlds energy.
- By 2000, it is estimated that 55% of the U.S. oil requirement will be imported.
- Current U.S. reserves cannot accommodate domestic requirements.
- U.S. oil production has peaked and will diminish significantly over the next ten years.

Efficiencies can be seen in all three of the fossil fuel industries -- oil, gas, and coal. However, the industries are becoming increasingly complex in production, processing, and distribution. This complexity will increase the requirement for more skilled workers and reduce the unskilled worker requirement.

The U.S. petrochemical industry has diminished as an export industry due to more foreign industries entering the market. However, the U.S. petrochemical industry's future remains bright. The technological race for superconductors, ceramics, and biotechnology has put the U.S. on the leading edge. This coupled with the availability of requisite hydrocarbon feedstock to fuel

the industry should keep the U.S. in a leading position.¹¹ The important aspect then becomes the investment in research and development for the technology breakthroughs of tomorrow.

Key to U.S. defense is mobilization. The fossil fuel availability is critical to this end and to the sustainment of U.S. forces. Our petroleum based economy will be only as good as our ability to ensure crude and product shipment from offshore. The strategic petroleum reserve (SPR) authorized in 1975 has proven itself as a deterrent to the manipulation of oil prices and thus availability.¹² Creative financing of increased reserve (i.e. leasing) may create bonds between the U.S. and supplier countries that may assist in cooperation in crisis situations.

An article in a 1942 Fortune Magazine stated: "In the final reckoning, all modern warfare comes down to fuel." This is still true today as we examine our ability to project power and will remain so for sometime to come. DoD uses 2-3% of the annual domestic consumption and in time of conflict it increases three to four-fold, which does not include the domestic consumption in support of the forces.

Critical Materials

"Foreign dependency was not a problem, but if the coalition had been different, if foreign suppliers had cut us off for political reasons we might have had trouble recovering."¹³

The final tier producer of almost any weapon system is the extractor or grower of the raw material. Surveys of congress, DoD, and industry officials show greater than 63% believe dependency is a problem and greater than 83% of the same group agree that efforts are needed to prevent foreign dominance.¹⁴

DoD reported to congress that only twice during Desert Storm was there trouble getting items from foreign suppliers. However, a Japanese spokesman confirmed that cooperation in the war effort was a touchy public issue in Japan.¹⁵

The potential dependence problem is not new. A 31 December 1980 report to the House Armed Services Committee by the Defense Industrial Panel chaired by Richard H. Ichord reported among other things:¹⁶

- The U.S. is heavily dependent on other nations for the supply of critical materials.
- The U.S. does not have an effective non-fuel mineral policy.
- There are trends toward excessive and unreasonable government regulation crippling basic mineral industries.
- Strategic and critical materials stockpiles are woefully inadequate and much requires upgrading.

A recent newspaper article reported: "9 billion dollar stockpile has military ready to refight World War I".¹⁷ It is apparent

that the current strategic stockpile practices and requirements need to be revalidated.

The current number of suppliers for any modern weapon system only exacerbates our ability to know the impact on any particular weapon system. For example, a senior Army officer very closely aligned with a major system said this system had over 11,000 suppliers (down to fourth tier for critical materials and parts). Recent changes in the DoD acquisition and development cycle require briefing sources of material at key decision points. This requirement helps but may not go far enough on some items. As industries become more transnational the problem will only get tougher. With global economies and smaller budgets, risks must be taken. However, they need to be prudent based upon the suppliers and need for the material upon mobilization.

Food and Textiles

DoD use of the food and textile industry represents less than 2% of the domestic market. With such little impact in a market affected by global trends, DoD must stay attuned to its needs in that many of DoD's requirements do not have or have limited commercial applications.

The agriculture industry has long been at the center of the U.S. economy. Agriculture is our nation's largest business and continuously contributes to a surplus of trade. While agribusiness is healthy, it does face major challenges. These challenges include: competition for water, high labor costs (though currently offset by technology), encouraging free trade, continuing to take advantage of technology to enhance efficiencies and open new markets, and the use of environmentally acceptable farming techniques without reducing efficiencies.¹⁸

Unlike the agriculture business the textile industry is a net importer. Greater than 55% of the textile market in the U.S. is imported. The major contributor to this problem is the off shore lower average labor costs contributing to larger profit margins.¹⁹

The greatest challenge for DoD and its executive agent for subsistence and textiles, the Defense Logistic Agency (DLA) is mobilization and meeting surge requirements. As in other areas of DoD, prior to the fall of the Berlin Wall, all planning and stockage was based primarily on the European scenario. Even under this larger scenario, insufficient stockage was available to meet the SWA requirement and alternative solutions were developed. Often discussed factors such as self life requirements, low level usage of operational rations, and non-

participation in peacetime procurement and use by services contributed to the stockage and surge problems.

DLA could not meet operation Desert Shield and Storm with prepositioned and surge operational rations. In August 1990, DLA had three producers who could only supply three million meals ready to eat (MRE) a month.²⁰ By wars end twenty two producers were supplying thirteen million a month. To meet the "requirement" an off-the-shelf ration was procured. The commercial ration known as the MORE (meal operational ready to eat) was expensive and served as a temporary substitute. The total shortfall is difficult to determine due to the host nation ability in coordination with DoD to provide catered "A ration" meals and an "A ration" issue to some field units. Many soldiers subsisted off this ration the majority of the deployment. With servicemen subsisting off this ration in the ports and built up areas, the operational ration requirement was reduced significantly. Though the MORE ration filled a need, soldiers required more calories than a single meal contained. It was common to see soldiers eating more than two MORE meals at a single setting. After a short period the novelty of the ration wore off and the soldiers welcomed their MRE or T-ration.

Much has been said about uniforms, boots and the lack of a production base. A production line was going and though it never met the demand, four suppliers were producing 136,000 boots in 60

days.²¹ The boots and uniform "problem" should not be blown out of proportion. Only the U.S. would reoutfit soldiers to new desert clothing and boots when sufficient stocks of the normal issue was available. Boots and uniforms were never a war stopper.

The most significant problem was that of chemical protective garments. Questionable shelf life, no commercial application, demand for large lots sizes, and small profit margins for manufacturers kept stockpiles small. Only 22% of the requirement was available. Though gains were made the total requirement was not met. The actions to correct the shortfalls would not have supported a protracted ground war in a chemical environment.²²

Conclusions drawn in the 1991 DIS warrant repeating in that they succinctly define the problems encountered during operations in SWA and those of the industry and DoD²³.

- Our agribusiness is number one in the world and serves as a productivity and efficiency goal for other industries.
- While combat ration shortfalls will occur during mobilization,, commercial off-the-shelf substitutes offer viable alternatives and reduce the necessity to preposition massive stocks of food that have a relatively short shelf life.
- There are no incentives for our agribusiness to produce military unique items. Conflicting procurement policies attempt

to maintain a large, inefficient production capacity for no visible reason.

- Unique military clothing and shelter items, such as chemical protective suits and tentage, are a concern. DoD planners must determine requirements and program industrial response.

- The Industrial Preparedness Program should be included in every contract let by the federal government, and funds should be available for the periodic audits of industrial acceleration and surge capabilities.

- Government policies that add firms to too small a market do not promote good business or sustainable military support. Policies that create excess surge capacity in manual plants and small lot sizes for unique items harm our industrial base.

SECTION V

CONCLUSIONS

The five ICAF Defense Industry Studies focused on in this examination are more than defense industries, they are national infrastructure industries. While DoD is a important customer of these industries in peacetime and must draw upon them heavily during crisis, they are not dependent upon DoD usage and often march to a different drummer. As the studies reported, all are critical in the accomplishment of DoD mission and have dramatic impact on the more pure defense industries. As they are national

infrastructure industries, they are also key elements of the defense infrastructure.

DoD must understand the problems within these industries and how to work with them to obtain the desired results. This is critical because, though DoD is a big customer, the industries do not depend on DoD for their survival. Small portions within these industries are exceptions, such as producers of combat rations, chemical protective garments, and special pharmaceutical needs require continued government support or the capability will be lost. In many instances, DoD does not need to work with the industry for their desired products, support, or services but provide support or pressure on other government departments to accomplish their objectives. For example, the Departments of Agriculture, Energy, Commerce, or Transportation will have a greater influence on these five industries than DoD. This is because the breadth and depth of the industries are monitored and in many situations controlled by these agencies.

With the end of the cold war and the national focus on the economy vice military power, the government must ensure a strong, stable, and growing domestic economy. The industrial studies addressed in this paper are key to this end. The ability of government to provide clear policy, promote domestic production, and remove barriers to international trade will establish the

foundation upon which U.S. national security will rest in the future.

As the government reassesses the world threat and our responses, so must they reassess the ability of the country to mobilize. Key will be assumptions on mobilization warning times and what risks we are willing to accept now. There are few areas where the nation can accept a "zero defects" mentality due to costs. It is therefore prudent to maximize efficiencies in areas not requiring zero defects to fund critical areas.

Several common threads run through the industries in this study. These common threads have been recurring from one year to the next. They have been closely examined by ICAF students in their DIS studies over the previous five years and have weathered the changes brought on by the collapse of the Soviet Union and the Gulf War. While section three and the appendices contain numerous recommendations, the following seem to be the underpinning of all of them:

- Develop a National Industrial Policy. This policy, once approved, should then be formulated into a strategy with orderly goals for its attainment.
- Develop a National Mineral Policy. This policy needs to address and recognize foreign sourcing versus foreign dependency.
- All strategies and policies need to provide interlocking mechanism between us and our allies. We must recognize the

transnational markets our economies are based upon.

- Recognize that policies and strategies are only as good as the follow on actions to execute them.
- DoD needs to develop a system to track foreign dependence on "critical" weapon systems or materials for the life of the system or item.
- DoD needs to pursue research in shelf life items. Shorter shelf life or off-the-shelf vice warehousing may be cheaper and easier to produce in the long run.
- DoD should review surge requirements and develop specific criteria for items. Many off-the-shelf items may meet DoD requirements with minor changes in DoD specifications.
- Concentrate mobilization planning more on secondary items (consumables and reparable).
- Incentivize commercial manufacturing to allow for easy conversion to military items from commercial or vice versa.
- DoD should negotiate tough but fair contracts with industry recognizing their need for a just profit.

In conclusion, the Chief of Staff of the U.S. Army, General Sullivan, recently stated: "Our challenge is to win the first battle of the next war". I contend, we may well be fighting the first battle of the next war now with these five industries and how we address and interact with industry on the above recommendations may well determine the winner. The J-4, JCS should act now in concert with DOD and appropriate agencies to

formulate solutions, guidance, and policy as applicable to begin fixing the problems identified. The significance of the recommendations will only grow with age.

APPENDIX A
ICAF OBSERVATIONS

RAILROADS AND TRUCKING

1987 DIS Recommendation²⁴

- A well thought out and coordinated plan to orchestrate DOD and the transportation industry during a national emergency.

1988 DIS Recommendation²⁵

- Improve relationship between government and industry, in particular find ways to ease procedures for companies to do business with the government.
- A single agency has to be established to coordinate all the various aspects of mobilization (FEMA has no authority or responsibility).
- USTRANSCOM's role must be clarified along with those of MTMC, MAC, and MSC.

1989 DIS Recommendation²⁶

- Government and industry must continue to solve the administrative and bureaucratic hurdles that exist between them.
- Railways need departmental/legislative correction of arachic union work rules.
- MTMC should complete the construction and refinement of a DOD mobilization data base.

1990 DIS Recommendation²⁷

- The Bush Administration's National Transportation Plan must be implemented as soon as possible.
- DOD and DOT must improve planning for and compliance with Executive Order # 12656 which directs the Secretary of the Transportation develop plans to met essential military needs and to provide direction to all modes of civilian transportation in national security emergencies.
- Electronic data interchange should be pushed forward to bring automatic billing and payment into a standardized computer to computer interface.

1991 DIS Recommendation²⁸

- Railroads need significant reorganization and updated collective bargaining procedures to remain competitive.
- Continued emphasis must be placed on the nation's highway infrastructure.
- Railroad management needs to play hardball with their labor unions.
- Congress needs to delete archaic labor laws binding railroads to obsolete and expensive procedures.
- Railroads must foster cooperative agreements between themselves and other modes.
- Legislation should be enacted to force medium and heavy trucks to pay more equitable highway usage fees.

APPENDIX B
ICAF OBSERVATIONS

MEDICAL

1987 DIS Recommendation²⁹

- War reserve stocks of medical materials must bridge the production lag time gap.

1988 DIS Recommendation

- None

1989 DIS Recommendation³⁰

Staffing:

- Correct the mobilization shortfalls of all health care providers by expanding incentive programs to recruit the required personnel into the Reserve Components.
- Identify civilian providers and prepare for a mobilization draft of required personnel.
- Do not allow third party managed care systems to disrupt the supply of health care personnel.

Facilities:

- Maintain adequate excess civilian hospital capacity to support national security contingencies.
- Reduce or eliminate the requirement to expand CONUS military hospital capacity upon mobilization.
- Develop patient management capability to effectively use

civilian capacity.

Transportation:

- Protect the aeromedical CRAF program and plan early activation of these aircraft in pre-crisis management to move medical personnel and supplies to the theater.
- Develop medical regulating capability to efficiently move casualties from theater to DOD, VA, and NDMS hospitals.

Logistics:

- Reevaluate standards of care planned for use in theater with the goal of reducing the total number of line items managed in mobilization stocks.
- Plan the early use of aeromedical CRAF to move medical supplies to theater. Use this capability to reduce the requirement for a 60 day stock level.
- Implement more plans for manufacturers or distributors to manage supply items with expiration dates.

1990 DIS Recommendation³¹

- The Domestic Council develop a national health care policy addressing access, delivery, and cost issues for both civilian and military needs. The policy should address both day to day problems, and those requiring a surge, emergency, or mobilization capability.
- DOD should fix its medical logistics supply and distribution problems with the Defense Personnel Supply Center (DPSC).
- DOD should address its medical manpower recruitment, training,

and retention problems.

- DHHS needs to further address the issues of manpower training, malpractice, quality of care, public education, financing, equitable access, and/or rationing of medical care.

1991 DIS RECOMMENDATION³²

Health Care Services:

- Continue to monitor trends in hospital closures for impact on wartime requirements.
- Enact legislation to limit medical malpractice judgements.
- Formalize a federal tax credit to provide incentives for managed care plans in the market place.
- Assure incentives are evident to attract, train, and retain qualified health care providers, insuring "proper" geographic and specialty distribution.
- Improve the education and skills of workers to deal with a more advanced technological work environment.

The Pharmaceutical Industry:

- Regularly assess the ability of the changing U.S. based pharmaceutical industry to produce critical drug items.
- Establish a forum to provide the medical industry government guidance and direction.
- Support the development of military unique products.
- Consider contracting out part of DPSC operations to save money and improve support to the field.

Medical Technology and Supplies:

- Institute tax credits for research, especially basic research in health sciences.
- Promote the continued export of medical technologies, supplies, and services. Negotiate with foreign countries to remove unfair trade barriers.
- Streamline FDA review of new products and technologies.
- Establish a policy for continued reimbursement for capital expenditures under the Medicare (part A) program.

Maintaining Medical Readiness:

- Continue the medical readiness modernization effort and support personnel accession initiatives that attract and retain required health care professionals.
- Continue funding for the development and fielding of the Field Medical Oxygen Generation and Distribution System, and the Resuscitative Fluid Production System.
- Evaluate risks taken by sole source procurement of any raw materials used in surgical instruments or pharmaceutical manufacturing.
- Reevaluate static turn key medical contingency operations in Europe in the light of the changing European threat.
- Design light, transportable, and mobile medical capability to support contingency operations and regional conflicts.
- Continue to preposition Class VII materials overseas.

APPENDIX C

ICAF OBSERVATIONS

FOSSIL FUELS AND PETROCHEMICALS

1987 DIS Recommendation³³

- Develop and implement a vigorous national energy policy.
- Fill the strategic petroleum reserve now.
- Prevent the loss of stripper wells to assure future production.
- Maximize coal use consistent with environmental constraints.
- Require new power plants to have the capability of using more than one type of fuel.
- Mandate prime contractors identify the users and producers of petrochemicals for military material from second and third tier vendors.
- Continue to explore alternative energy sources and encourage conservation.

1988 DIS Recommendation³⁴

- Promote and achieve energy security with a coherent national energy policy.
- Fill the SPR to 1 billion barrels.
- Stimulate domestic production.
- Educate the Congress and the public on the need for steady energy program growth.
- Continue emphasis on energy conservation.
- Avoid dependence on any one source.

- Maintain adequate and readily available reserves (coal & natural gas).
- Provide options for the easy conversion of sources for electrical generation.
- Maintain various options for producing energy via technological (R&D, prototyping, etc.) and trained/educated personnel.

1989 DIS Recommendation³⁵

- Take steps to reduce vulnerability to disruptions in oil supply.
- Invest more in clean coal technology.
- Encourage greater use of renewable energy sources.
- Increase the size of the SPR to 1 billion barrels.
- Strengthen/improve relations with Canada, Mexico, and Venezuela.
- The U.S. should continue development efforts to come up with alternative sources of energy for its transportation needs.

1990 DIS Recommendation³⁶

- Increase the Strategic Petroleum Reserve (SPR) to 1 billion barrels using leased oil.
- Subsidize a modest level of synfuel production.
- Significantly increase the R&D into the causes and effects of the global weather changes that may be resulting partially as a result of our burning fossil fuels.
- Subsidize, through appropriate economic incentives, R&D and

test plant construction of the most promising renewable energy technologies (windpower, solar, biomass, nuclear).

- Increase R&D into the construction of methane tanks for transportation purposes.
- Provide economic incentives to expand refinery capacity.
- Consistent with environmental concerns, explore and develop the Alaskan Wildlife Reserve.
- Improve the security of our petroleum distribution infrastructure.
- Extensively implement the next generation of small modular nuclear powerplants.
- Aggressively conduct R&D into developing a safe and efficient nuclear fusion technology and implement it as soon as it is feasible.
- Expand other renewable energy resources, as appropriate, to areas and uses that cannot be satisfied by nuclear power.
- Aggressively expand research into commercially viable electric cars, trucks, etc.

1991 DIS Recommendation³⁷

- Incentivize energy related industries and markets.
- Promote renewable energy sources.
- Put energy conservation back on America's agenda.
- Rethink and work to resolve nuclear energy issues.
- Restructure the price of conventional petroleum.
- Give natural gas a chance.

APPENDIX D
ICAF OBSERVATIONS

CRITICAL MATERIALS

1988 DIS Recommendation³⁸

- Study material industries on a global basis.
- Meet periodically with allies on selected materials.
- Participate in International Commodity Organizations.
- Conduct comparative studies of essential material management.

1989 DIS Recommendation³⁹

- Establish a hemispheric approach to supply the U.S. with its requisite selected materials.
- Foster better relations within the Western Hemisphere in an attempt to expand the economic, political, and military relationships.
- Critical materials are a key building block with impact across the spectrum of economic, political, and military. Let's take advantage of what's available within our hemisphere and strengthen our relationships.
- Investigate the need for a National Industrial Security Policy to include the industrial base, the National Stockpile, and critical/strategic materials.

1990 DIS Recommendation⁴⁰

- The Federal Government requires a national level policy

planning and coordinating unit (perhaps an enlarged critical materials Council) to deal more effectively with problems and issues.

1991 DIS Recommendation⁴¹

- The U.S. does not have a national mineral policy. Formulation of a comprehensive policy for materials resources will necessitate considering some of the following policy issues: Environmental Pollution, Antarctica, the Defense Production Act (expired: Oct 1990), Mine Safety, Composite Materials, Training and Manpower, Deep Seabed Mining, Subsidies for Domestic Mining Industries, National Defense Stockpile, Remote Sensing and Mineral Exploration Policies, and International Economic opportunity.

APPENDIX E
ICAF OBSERVATIONS

FOOD AND TEXTILES

1990 DIS Recommendation⁴²

- Drop surge capacity requirements for unique item vendors where the lack of any commercial application causes severe inefficiencies, high costs or low profits.
- Continue to study the feasibility of using shorter shelf life commercial food products for combat rations and more easily assembled chemical suits from available materials to meet military requirements.
- Coordinate "competition" and industrial base expansion efforts such that small qualified vendors are not reduced to producing inefficient lot sizes.
- Execute no further contracts involving government furnished equipment, but use one contractor as prime to offer incentives for efficiency and prevent inefficiency due to government non-performance.
- Freeze lot sizes in contracts to prevent decreases which may cause current producers of marginally productive unique items to go bankrupt.
- Incentivize flexible manufacturing techniques to allow for easy conversion from military to commercial items in both food and textiles.
- Use shelf life of apparel items to advantage by producing

larger lot sizes and storing for mobilization preparedness or increase automated apparel manufacturing contracts and store textile bolts rather than higher value-added finished garments.

- An inter-agency review group be established to advise all agencies (DOD, Departments of Agriculture and Commerce, OSHA, Public Health Service) of policy disconnects, to set goals, and to implement coordinated policy in those areas where the government already impacts the food and textile industries.

1991 DIS Recommendation⁴³

- Drop surge capacity requirements for unique item vendors where the lack of any commercial application causes severe inefficiency, high cost, or low profit.

- Use commercial off-the-shelf food products to satisfy the requirement for combat rations and rations for contingency operations.

- Pursue research and development of chemical protective suits that can sustain extended storage and require no unique materials for fabrications.

- Coordinate competitive and industrial base expansion efforts such that small qualified vendors are not reduced to producing inefficient lot sizes.

- Freeze lot sizes in contracts to prevent decreases which may cause current producers of marginally productive unique items to go bankrupt.

- Use shelf life of apparel items to advantage by producing

larger lot sizes and storing for mobilization preparedness or increase automated apparel manufacturing contracts and store textile bolts rather than higher value-added finished garments.

- Incentivize flexible manufacturing techniques to allow for easy conversion from military to commercial items in both food and textiles.

- While a national policy is probably not attainable -- the articulation of national goals are. Articulation of these goals and the consensus on necessary actions require strong leadership and a unified effort by all government agencies involved in the agribusiness.

1. Sun Tzu. The Art of War. Trans. and Intro. Samuel B. Griffith. New York: Oxford University Press, 1963.p.97.
2. The US Defense Industry -- Key Issues for the 1990s. A Survey Report. Ernst and Young, 1989. E&Y No. A58051.p.1.
3. "Ill-Advised Rush to Cuts" Defense News, Commentary. March 2, 1992, p.18.
4. Ibid, p 18.
5. "Defense Industry Studies Syllabus Spring 1992". Dept of Resource Management, Industrial College of the Armed Forces, National Defense University, 18 Nov 1991, p. 1.
6. Defense Industry Summaries, Academic Year 1988-1989. (National Defense University, Washington, D.C.), Section 11, p 4.
7. Defense Industries Summaries, Academic Year 1990-1991. (National Defense University,, Washington D.C.), Section 11, p 20.
8. Richter, Frank. "Railroad Initiatives", Progressive Railroading, February 1992, p 92.
9. Defense Industry Summaries, Academic Year 1989- 1990, (National Defense University, Washington D.C.), Section 13 p 27.
10. Defense Industry Studies, Academic Year 1990-1991. (National Defense University, Washington D.C.), Section 4, pp 5-22.
11. Ibid, p 8.
12. Bamberger, Robert. "The Strategic Petroleum Reserve", CRS Issue Brief, Order Code IB87050, August 19,1991, p.1.
13. "Lifeline Adrift-- The Defense Industrial Base in the 1990s", the Aerospace Education Foundation, Arlington, Va. September 1991, p 16.
14. The US Defense Industry -- Key Issues for the 1990s. A Survey Report, Ernst and Young. E&Y No. A58051, p 16-17.
15. "Lifeline Adrift-- The Defense Industrial Base in the 1990s", the Aerospace Education Foundation, Arlington, Va. September 1991, p 15.
16. Vawter Roderick L. Industrial Mobilization: The Relevant History. National Defense University, Ft McNair, 1983, p 73.
17. Thompson, Mark. "\$9 Billion Stockpile Has Military Ready - To Refight World War I", Baltimore Sun, February 21, 1992, p 1.

18. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 15, pp 7-9.
19. Ibid, p 12.
20. "Lifeline Adrift-- The Defense Industrial Base in the 1990s",
the Aerospace Education Foundation, Arlington, Va. September 1991,
p 13.
21. Ibid, p 14.
22. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 15, pp 16.
23. Ibid, p 19.
24. Defense Industry Summaries, Academic Year 1986-1987.
(National Defense University, Washington, D.C.), Section 11.
25. Defense Industry Summaries, Academic Year 1987-1988.
(National Defense University, Washington, D.C.), Section 11, pp 172-173.
26. Defense Industry Summaries, Academic Year 1988-1989.
(National Defense University, Washington, D.C.), Section 11, pp 15-16.
27. Defense Industry Summaries, Academic Year 1989-1980.
(National Defense University, Washington, D.C.), Section 11, pp 18-19.
28. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 11, pp 18-22.
29. Defense Industry Summaries, Academic Year 1986-1987.
(National Defense University, Washington, D.C.), Section 13.
30. Defense Industry Summaries, Academic Year 1988-1989.
(National Defense University, Washington, D.C.), Section 13, pp 13.
31. Defense Industry Summaries, Academic Year 1989-1990.
(National Defense University, Washington, D.C.), Section 13, pp 29-30.
32. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 13, pp 18-19.

33. Defense Industry Summaries, Academic Year 1986-1987.
(National Defense University, Washington, D.C.), Section 4.
34. Defense Industry Summaries, Academic Year 1987-1988.
(National Defense University, Washington, D.C.), Section 4, p 68.
35. Defense Industry Summaries, Academic Year 1988-1989.
(National Defense University, Washington, D.C.), Section 4, p 16.
36. Defense Industry Summaries, Academic Year 1989-1990.
(National Defense University, Washington, D.C.), Section 4, pp 20-21.
37. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 4, pp 19-20.
38. Defense Industry Summaries, Academic Year 1987-1988.
(National Defense University, Washington, D.C.), Section 14, pp 213-214.
39. Defense Industry Summaries, Academic Year 1988-1989.
(National Defense University, Washington, D.C.), Section 14, pp 6-7.
40. Defense Industry Summaries, Academic Year 1989-1990.
(National Defense University, Washington, D.C.), Section 14, pp 7-12. Recommendations include material policy issues which if addressed would go along way to developing a policy.
41. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 14, pp 10-17. Recommendations include material policy issues which if addressed would go along way to developing a policy.
42. Defense Industry Summaries, Academic Year 1989-1990.
(National Defense University, Washington, D.C.), Section 15, pp 19-20.
43. Defense Industry Summaries, Academic Year 1990-1991.
(National Defense University, Washington, D.C.), Section 15, pp 22-23.